

Stakeholder Working Group, February 27, 2007

Description of Options for Reducing Emissions from the Residential Sector (RCI-1 to 34)

The Utah Department of Natural Resources' 2000 report on greenhouse gas reduction strategies provides this overview of emissions from the residential sector:

The Utah residential sector is forecast to release 11.6 million tons of CO₂ by the year 2010, up from 7.8 million tons of CO₂ in 1990. This represents a total increase of 49.2 percent, or about 2.5 percent a year. The residential sector accounted for 18.4 percent of Utah's energy-related CO₂ emissions in 1990 and decreased to 17.9 percent in 1998. By 2010, it should account for 16.7 percent of Utah's GHG emissions.

The typical household in Utah is responsible for about 14 tons of CO₂ emissions annually. Considering both electricity sales and their associated losses, most of the emissions in the residential sector, about 62 percent, result from electricity use. Computers, hair dryers, electric stoves, and other major and minor appliances are powered from an external source. In Utah, this source usually consists of power plants, with about 95 percent of power generation from coal-fired sources. Each kWh delivered to the end user at the electric outlet results in about 2.37 pounds of CO₂ generated by a power plant.

Strategies to reduce emissions in this sector can be separated into two main areas. The first category is major electricity end uses, which includes space heating, water heating, refrigerators, and air conditioning, while the second category includes lighting and appliances. An interesting aspect of appliances is that this category can also be divided into major and minor uses. Major appliances are such things as washing machines and clothes dryers. Minor appliances include everyday household items such as electric razors, blenders, and can openers. While reductions can be obtained within all appliances, this report focuses on major appliances. One of the criteria in selecting strategies was that of identifying meaningful strategies of GHG emissions reductions. Though strategies for minor appliances taken as a whole could lead to a meaningful reduction, as individual appliances they do not lead to major reductions.

The second type of strategy is to change living conditions and behavior. This type of strategy is not as neatly defined as energy efficiency measures but it is useful. This type of strategy might involve changing "structural" elements of a residence. For example, the type and quality of insulation and windows play an important role in determining the amount of energy used to create heat and air conditioning. This category of strategies also tries to alter household behavior. An illustration of this might be a strategy that tries to promote conservation through a public awareness campaign. Alternatively, conservation could also be encouraged through increasing the cost of electricity through taxes or other measures.

Residential/Commercial/Industrial

RCI-1

Name: Mandatory or Voluntary Reporting of Fuel Use, GHG Emissions

Should this be addressed in the cross-cutting category? What issues should be in this general residential/commercial/industrial category versus placed in one or more of the 3 categories?

Definition/examples:

Volume of Emissions in Utah:

Benefit/cost of reducing CO₂ —cost per ton reduced:

How implementable the option is in Utah:

Implemented by legislation required if structured at higher, coarse-grain, level.

Impacts, distribution of burdens, co-benefits:

Other comments/assessments:

Essential to set up and run and measure progress

RCI-2

Name: Cross-sectoral Energy Efficiency Funds or Requirements for DSM (e.g. Public Benefit Funds, Utility Savings Goals, or Energy Portfolio Standards)

Should these be assessed as separate options? Many are discussed below and in the industrial and commercial sectors.

Compare with RCI-12, 38, and 63

Definition: Many states impose a tax or surcharge on energy users and use revenues to fund energy efficiency and renewable energy projects. An energy efficiency fund (EEF) is an example of DSM and requires energy providers to generate a specified portion of their energy to consumers through energy efficiency measures. Renewable portfolio standards (RPS) work in much the same way, the only difference being that utilities are required to provide a specified percentage of their energy output through renewable energy. A public benefit fund (PBF) is a method of funding energy efficiency programs by means of a small charge on a consumer's electricity bill. These forms of DSM are typically designed to overcome barriers to investment in energy efficiency and renewable energy programs.

State legislation is usually required to set EEF and RPS targets and an executive agency is necessary to oversee implementation of the programs. Once implemented, funds can be allocated to the DSM programs from a PBF. Some states require utilities to use their own funds for the development of EEF and RPS programs. For example, California requires its utilities to allocate their own procurement funds to their EEF programs. A PBF also requires state legislation and an oversight committee to guarantee effective implementation. In all three of these DSM programs utilities will also play a key role in implementation, processing charges, and collecting results data. In regards to the PBF, flexibility in the administration of the fund is important for cost-effectiveness.

http://www.epa.gov/cleanenergy/pdf/gta/guide_action_full.pdf

Volume:

Cost: NM: -\$18/ton (DSM programs for electricity), -\$ 55 per ton of CO₂ (DSM programs for natural gas and other fuels) AZ: -\$36/ton

Implementable:

Yes—implementable.

Impacts:

Impacts will be determined by market-place.

Other comments:

RCI-3

Name: Voluntary or mandatory efficiency targets

Definition: Specific sectors to set targets or set state-wide targets; could be voluntary or mandatory. (Utah's current energy efficiency target applies only to state facilities).

Volume:

Cost:

Implementable:

Voluntary must be cost-effective if they are going to work.

Impacts:

Other comments:

Be careful of side effects/contradictory targets (i.e. emissions increase). These are important to drive desired changes.

RCI-4

Name: Regional Market Transformation Alliance

Definition: Modeled on the NW Energy Efficiency Alliance and recommended by the WGA task force, a regional organization could pursue regional efforts to promote voluntary actions to conserve energy

Volume:

Cost: NM: -\$27/ton

Implementable:

Depends on situation in region, options/resources available, conditions for alliances to be successful.

Impacts:

State-to-state imbalances and within sectors; interstate and intrastate imbalances.

Other comments:

RCI-5

Name: Negotiated Emissions or Energy Savings Agreements

Same as RCI-74 ?

Definition:

Volume:

Cost:

Implementable:

Depends on commitment to sustainability and other issues.

Impacts:

Other comments:

Needs study.

RCI-6**Name: Green Power purchasing**

Definition: Consumer-driven strategies to increase production and delivery of power from renewables. Green power is electricity generated by using resources with a minimal effect on the environment such as wind, solar, and geothermal resources.

The Utah Department of Natural Resources analysis included only wind, solar, and geothermal resources as green power, but other sources could be included since the “greenness” of different power sources is a matter of degree. Green pricing refers to selling green power within a regulated environment, presumably at a price above that of the current rate. The rationale behind this option is to give consumers who prefer to use Green power the option to do so. The introduction of new renewable resources helps diversify the system, reduces environmental degradation, increases system capacity, and reduces GHG emissions. Of all the sectors, experience from other states shows that the residential sector is most likely to participate followed by the commercial sector and the industrial sector. By 2010 it is feasible that 5 percent of the consumers in the residential sector, 3 percent in the commercial sector and 2 percent in the industrial sector would likely participate in such a program, given an aggressive marketing campaign (Utah, 2000).

Volume:

Cost: A feasible strategy reduces CO₂ emissions 62,000 tons at \$21 per ton. Green power marketing has the potential to reduce CO₂ emissions by 124,000 tons at \$18 per ton (Utah, 2000). NM: \$7/ton.

Implementable:

Implementable, but results are mixed.

Impacts:

Can be costly and imbalanced.

Other comments:

RCI-7**Name: Rate Design**

Related to RCI-2

Description: Changes in rate structure such as discouraging decreasing block rates, inverted block rates that impose higher tariffs on larger users, and pursuing peak time surcharge rates to encourage energy efficiency

Volume:

Cost: NM: -\$40/ton. AZ: -\$63/ton

Implementable:

Yes—implementable.

Impacts:

Have to be careful re impact on industrial and large users, contradicts cost of services doctrine.

Other comments:

RCI-8

Name: Distributed generation with combined heat and power systems

See RCI-76.

Definition: Regulations and/or incentives to encourage CHP as a way to improve efficiency of fuel use.

Volume:

Cost: AZ: -\$25/ton. Generally has required incentives due to cost hurdles.

Implementable:

Hard to do where infrastructure is in place; easier where not in place, access to info also a driver.

Impacts:

Unplanned cost-who pays for a local system?

Other comments:

RCI-9

Name: Distributed generation/renewable energy applications; net metering

Definition:

Net Metering. Net metering provides an additional strategy to provide more electric power generation from renewable sources. It uses a single meter to measure the difference between the total generation and total consumption of electricity by customers with small generating facilities by allowing the meter to turn backward. Net metering can increase the economic value of small renewable energy technologies for customers. It allows the customers to use the utility grid to “bank” their energy: producing electricity at one time and consuming it at another time. This form of energy exchange is particularly ideal for renewable energy technologies. Small-scale electricity generated from renewable energy sources is sold back to the electric utility at retail prices rather than cost (Utah, 2000).

Other incentives for the increased implementation of distributed renewable energy systems among consumers are direct subsidies for the purchase of renewable energy systems and tax credits or exemptions given to the buyer of a renewable energy system. A state could also decide to support research and development funding of promising renewable technologies. (

<http://www.nmclimatechange.us/ewebeditpro/items/O117F10150.pdf>)

Utilities in at least 41 states allow customers to produce electricity and sell it back to the grid.

See RCI-79

Volume:

Cost: UT: Net metering has the potential to reduce CO₂ emissions by 87,000 tons at \$287 per ton; a feasible strategy reduces CO₂ emissions by 46,000 tons at that cost.

NM: \$105/ton of CO₂. This cost is estimated only for incentives for renewable technology implementation. The New Mexico climate report does not offer a cost per ton for specific technologies.

AZ: \$31/ton.

Questionable cost-effectiveness—emissions rules may add cost, or reduce them if large systems are charged for their emissions.

Implementable:

Impacts:

Other comments:

Equipment and Appliances: Improve Efficiency/Increase Use of Lower-GHG Fuels

RCI-10

Name: State Appliance Efficiency Standards

Definition: A policy could replicate CA standards or develop own standards for appliances not covered by federal standards.

Refrigerators: Refrigerators and freezers account for 15 percent of electricity use in the Utah residential sector. The average refrigerator in Utah uses approximately 1,155 kWh per year; the average freezer uses 1,200 kWh per year. Conservatively assuming that the stock of refrigerators and freezers in Utah meets the minimum 1993 levels, and that these appliances will average a 25 percent efficiency gain, the average refrigerator sold after 2001 will use less than 850 kWh per year, and the average freezer sold after 2001 will use less than 900 kWh per year. A feasible strategy reduces CO₂ emissions by 9,000 tons at \$45 per ton. Premium refrigerators have the potential to reduce CO₂ emissions 150,000 tons at \$45 per ton.

Clothes Dryers: Clothes dryers account for approximately six percent of energy use in the Utah residential sector. However, clothes dryers do not present a significant opportunity for reductions in energy use, given current technologies.

Clothes Washers: Clothes washers use more than nine percent of the electricity within the Utah residential sector. The amount of energy a clothes washer uses is determined largely by design. For example, a tub that is front loading rather than top loading saves energy. Energy-efficient clothes washers use less hot water than less efficient washers. The EPA's Energy Star® program has identified washers that are at least 30 percent more energy efficient than those that meet the minimum standards and confers an Energy Star® rating on those machines if they meet a higher energy-efficiency standard. These more energy-efficient products often cost more, but they frequently pay for themselves through a reduction in consumer energy bills. Energy-efficient clothes washers have additional benefits as well. Energy Star® reports that in addition to using 30-40 percent less energy, these washers use 50 percent less water, cause less wear and tear on clothes, and extract water better, which may lead to an additional energy savings when a clothes dryer is used (Utah, 2000).

Arizona law sets minimum energy efficiency standards for the following 12 products not covered by current federal standards: torchiere light fixtures, exit signs, commercial refrigerators and freezers, commercial clothes washers, large commercial air conditioning equipment, icemakers, spray nozzles used in commercial kitchens, low-voltage distribution transformers, metal-halide lamp fixtures, power supplies for electronic devices, unit heaters, and traffic signals. According to the Southwest Energy Efficiency Project (SWEET), the standards will save Arizona consumers and business a total of \$650 million on energy bills by 2030. See http://www.eere.energy.gov/state_energy_program/news_detail.cfm/news_id=9028

Volume:

Cost: NM: -\$46/ton. AZ: -\$66/ton

Implementable:

Driven by local energy costs and principle-driven decisions.

Impacts:

Other comments:

RCI-11

Name: Promotion and Tax or Other Incentives (e.g. Energy Star products, solar hot water heaters)

See RCI-60

Definition:

Energy Star is a federal program designed to help state/local governments, businesses, and schools achieve energy management that saves money and reduces environmental impact. Energy Star offers information, technical assistance, and outreach that enable participants to make financially attractive improvements to their facilities.

http://www.epa.gov/cleanenergy/pdf/gta/guide_action_full.pdf

CA has manufacturer rebates available for consumers purchasing appliances that meet CA specific energy standards. See http://www.fypower.org/res/tools/rgl_results.html?z=92507&s=res

Arizona homeowners are allowed an income tax deduction of 5% of the sales price (up to \$5,000) if the residence is certified to be 50% more energy efficient than the 1995 Model Energy Code. The average tax savings is \$190. The credit is available for new homes built before December 2010. See Alliance to Save Energy. <http://www.ase.org/content/article/detail/2607>

Volume:**Cost:****Implementable:**

Implementable, need better education and communication.

Impacts:

Market-driven. Tax shift—tax burden falls on different societal sectors.

Other comments:

RCI-12

Name: Other utility/DSM Programs

See RCI-2 and the specific options discussed below.

Definition:

Volume:

Cost:

Implementable:

Impacts:

Other comments:

RCI-13

Name: Market transformation and technology development programs (also applies to buildings) eligible for additional federal tax credits

Definition:

Market programs can also include the promotion of consumer driven strategies designed to increase the consumption and production of low GHG energy sources. Programs to promote the expansion of the renewable/energy efficiency market can include: 1) Education to increase the level of consumer awareness of clean energy benefits and options. 2) Requiring utilities to provide information on fuel sources and their emissions to consumers. 3) The formation of large customer buying groups or aggregation. 4) The verification of the claims regarding clean energy products in order to protect the consumer. 5) States agencies can purchase green power to meet their own needs thus helping to form the renewable market. (http://www.epa.gov/cleanenergy/pdf/gta/guide_action_full.pdf)

The New Mexico report cites the Northwest Energy Efficiency Alliance (NEEA) as an example of successful regional transformation. It should be noted that the NEEA pursues market transformation in the residential sector through the application of the Energy Star program. For more info see: http://www.nwalliance.org/ourwork/ourwork_bysector.aspx?sector=residential

In 2006, CA initiated a Performance Based Incentives Program for solar systems which includes incentive levels for residential and commercial customers who will receive \$2.50 per watt and will be eligible for additional federal tax credits. See http://www.gosolarcalifornia.ca.gov/csi/performance_based.html

Volume:

Cost: NM: -\$27/ton of CO₂. It is important to note that this reflects the cost of regional market transformation and is not confined to an individual state.

Implementable:

Yes—in progress.

Impacts:

Market-driven

Other comments:

Availability of technology solutions is growing, market is working well in this area.
market speaks for itself

RCI-14**Name: Consumer education programs**

Definition: Develop programs aimed at specific audiences, such as community leaders, organization heads, homeowners, young people, etc. Consumer education programs can raise consumer awareness of energy efficient products that save money as well as reduce GHG emissions and produce other public health benefits. Increasing consumer awareness will establish a long term base of consumers for the clean energy market. See <http://www.nmclimatechange.us/ewebeditpro/items/O117F10152.pdf>

New Mexico suggests the creation of outreach coordinator positions, education of the media about climate change, education within the public school system and universities, education of policy makers, and the requirement of annual GHG reduction reports from specific industries. This would likely require state legislation. See <http://www.nmclimatechange.us/ewebeditpro/items/O117F10152.pdf>

Volume:**Cost:****Implementable:**

Very important; must meet standards in schools; need to focus on specific behaviors of consumer. Message generally not highly received.

Impacts:**Other comments:**

RCI-15

Name: Focus on specific end-uses/technologies: window AC units, lighting, water heating, plug loads, etc.

Definition:

Residential Indoor Lighting: Indoor lighting accounts for approximately 12 percent of electricity use in the Utah residential sector. Residential lighting has the potential to reduce CO₂ emissions by 230,000 tons at \$12 per ton. The amount of electricity that a bulb uses is largely dependent on the bulb type. The most common in the residential sector is the incandescent bulb. Roughly 80 percent of indoor residential lighting is made up of incandescent lights. A 75-watt incandescent bulb has an estimated life of 750 hours, and the average home pays 0.44 cents an hour to use a 75-wattbulb, assuming that a kWh costs 5.88 cents. The average residential light is used roughly 3 hours every day, so bulb life is estimated at 9 months. Twenty percent of indoor residential lighting consists of fluorescent bulbs. The cost of a 22-watt compact fluorescent bulb is assumed to be \$10 (prices are much lower in 2007) with an estimated life span of over 9 years, assuming use comparable to an incandescent bulb, and would cost the average home 0.13 cents an hour to use, at 5.88 cents per kWh. Although the fluorescent bulb costs more than the incandescent bulb, the cost of replacing incandescent bulbs and the additional electricity needed to use such bulbs is higher than the cost of the costs associated with the life-cycle cost of a fluorescent bulb. A fluorescent bulb pays for itself in just over 2 years. Fluorescent bulbs use 70 percent less electricity than incandescent bulbs. This reduction of energy directly corresponds to a reduction of GHG emissions.

Volume:

Cost: UT: \$15-24/ton for lighting improvements. A feasible strategy reduces CO₂ emissions by 29, 000 tons at \$16 per ton.

Implementable:

Related to utility DSM programs, appliance standards, education

Impacts:**Other comments:**

Incorporate into education; consider possible rebates.

RCI-16

Name: Bulk Purchasing Programs for Public Housing and New Developments

See RCI-37

Definition: CA provides incentives for volume purchasing of ENERGY-STAR products (<http://www.cpuc.ca.gov/static/energy/electric/energy+efficiency/generalDescriptions.htm>)

Volume:

Cost:

Implementable:

Is it implementable? Start with low income housing?

Impacts:

Other comments:

Market-driven + economies of scale in purchasing, combined with up-front standards and codes for buildings. Definitely look at Green Tags.

RCI-17**Name: Appliance pickup/recycling programs**

Definition: Voluntary or mandatory program to specify a recycling rate, reduce methane from landfills through increased recycling, encourage composting and other efforts.

Variations on this type of program may also include lawnmower trade-in programs, high-efficiency toilet exchanges, old vehicle scrapping programs, etc.

Volume:**Cost:****Implementable:****Impacts:****Other comments:**

Buildings: Improve Efficiency and Increase Use of Lower-GHG Fuels

RCI-18

Name: Incentives for Improved Design and Construction (e.g. Energy Star, green buildings, expedited permitting)

Definition:

Arizona Public Service's Performance Built Homes program provides marketing and financial assistance to builders that guarantee a home's annual heating and cooling bills will not exceed a certain maximum level. All homes must first exceed the minimum requirements for the EPA Energy Star Home program. Then, for those builder's guaranteeing heating and cooling bills under a product manufacturer's program (such as the Certified Plus, Engineered for Life, or Environments for Living programs), APS will pay 50% of the builder's inspection costs (which can range from \$50 to \$250 depending on the program requirements) associated with the obtaining the manufacturer's guarantee. Fifteen production and custom homebuilders in the metropolitan Phoenix area offer the guarantee. The program also offers educational materials and training to homeowners, subcontractors and builders, consumer education. The incremental costs to build homes that just meet code versus base-case homes vary by location from \$1,500 to \$3,700. The incremental cost to build ENERGY STAR + homes versus base-case homes varies from \$7,000 to \$8,500. In spite of somewhat higher initial costs, lifetime (30-year) savings of ENERGY STAR + homes versus base homes average \$17,000 under the conservative assumption that energy costs will track inflation. If energy prices outstrip inflation, conservation investments will yield even better returns. See <http://www.swenergy.org/programs/arizona/utility.htm>

The California Energy Commission has a 10-year, \$350 million program to encourage solar in new home construction. See <http://www.gosolarcalifornia.ca.gov/csi/index.html>.

CA Solar Initiative offers cash incentives on solar systems of up to \$2.50 a watt, which combined with federal tax incentives, can cover up to 50 percent of the total cost of a solar system See: http://www.cpuc.ca.gov/static/energy/solar/_index.htm

Volume:

Cost:

Implementable:

See RME/Questar Energy Star Homes.

Impacts:

Other comments:

RCI-19**Name: Solar hot water and PV codes for new buildings**

Definition: Require new buildings to be configured and wired for solar hot water heaters and PV panels; require buildings with heavy use of heated water to install solar water heaters.

Tucson implemented the 2000 version of the International Energy Conservation Code (IECC 2000) in July of 2003, and a number of other smaller jurisdictions have adopted this or a similar up-to-date code. See http://www.swenergy.org/iecnb/codes_report.pdf

In California, to encourage affordable housing developers to include PV in their developments, the California Energy Council will accommodate builder needs by providing a 25% higher rebate, not to exceed 75% of the total system cost, if affordable housing applicants meet several specific criteria. Eligible projects include single- and multi-family developments where at least 20% of the project units are reserved for very low-, lower-, or moderate-income households for a period of at least 45 years. The PV systems in multi-family projects must serve only the project units reserved for extremely low, very low, lower, or moderate income households and the manager's unit. The PV systems may serve common areas in a multi-family project only where all of the project's units are reserved for extremely low, very low, lower or moderate income households. See <http://www.gosolarcalifornia.ca.gov/nsbp/affordable.html>

Volume:**Cost:****Implementable:**

Solar hot has good pay-back.

Impacts:**Other comments:**

RCI-20**Name:** Energy efficiency improvements in home heating and cooling**Definition:**

Electric Water Heater to Natural Gas Conversion: Approximately 33 percent of water heaters in Utah are electric, and electric water heaters account for 13 percent of residential electricity use. Natural gas provides a cheaper and more efficient energy source for water heating and results in fewer CO2 emissions. Conversion to natural gas has the potential to reduce CO2 emissions 64,000 tons at \$20 per ton. A feasible strategy reduces CO2 emissions by 10,000 tons at less than \$30 per ton.

Volume:**Cost:** UT: \$20-30/ton for home heating and cooling

Why are costs so high?

Implementable:**Impacts:****Other comments:**

RCI-21

Name: Focus on specific market segments: existing homes (weatherization), new construction, apartments, low income, etc.

Definition:

Weatherization: Weatherization includes various home improvement and maintenance projects that improve energy efficiency such as high-efficiency windows and insulation. This strategy leads to substantial reductions in residential sector GHG emissions through direct reductions in electric power and natural gas consumption by households.

The California Public Utilities Commission (CPUC) is currently working to craft an incentive program that can specifically meet the needs of California 's existing low income households and affordable housing communities. In January 2006, the CPUC committed to reserve 10% of state program funds over 10 years to promote participation by low income households living in existing housing structures. See <http://www.gosolarcalifornia.ca.gov/csi/low-income.html>

Volume:**Cost:****Implementable:****Impacts:****Other comments:**

RCI-22**Name: Contractor and Builder Education****Definition:**

A policy could order/encourage suggest state boards of licensing to include new building codes; training programs on practices such as proper sizing of HVAC, duct sealing; encourage design of energy-efficient communities.

In California, Energy Design Resources (EDR), offered through the Statewide Savings By Design program, provides design teams (architects, engineers, lighting designers, facility owners, and developers) with tools, training and resources that make it easier to design and build energy-efficient commercial, industrial and agricultural facilities. Training is located at various local utilities and there is no cost to attend. See

http://www.fypower.org/res/tools/rgl_results.html?z=92544&s=res&c=Training%20%26%20Certificati on

Volume:**Cost:****Implementable:****Impacts:****Other comments:**

RCI-23**Name: "Reach" codes**

Definition: Promote higher than prevailing-code energy performance levels for building; create incentives for new buildings and retrofits.

Volume:

Cost: NM: -\$2/ton. AZ: -\$17/ton

Implementable:**Impacts:****Other comments:**

RCI-24**Name: Improved Building Codes**

Definition: Building codes set the minimum standards to which homes must be constructed. The purpose of these codes is to standardize buildings to ensure that buildings meet a minimum level of safety, public health, energy efficiency, conformity with the public infrastructure, and other purposes. Building codes could focus on HVAC systems, daylight lighting to reduce lighting needs, electric lighting design. Currently, the Utah residential code is based on the 1995 Model Energy Code.

EnergyStar®Homes: Energy Star® Homes is a program that works with home builders to provide homes that are at 30 percent more efficient than homes built to meet the minimum requirement of the Model Energy Code. The Energy Star® Homes program rates three major areas: heating, cooling, and water heating. These areas make up about 37 percent of Utah's electricity use in the residential sector. As an incentive to encourage builders to incorporate better building practices, the Energy Star® Homes program certifies that the home exceeds the Model Energy Code by at least 30 percent. This label may act as an additional incentive when purchasing the home and may lead to preferred mortgage finances from lending institutions since the label serves as a verification of lower than average energy bills. Exceeding the Model Energy Code by 30 percent will also cut heating and air conditioning costs in proportion to a decline in energy use. It is estimated that the average Energy Star® Home costs somewhere within the range of \$200 to \$500 more than home that only meets the minimum standards of the Model Energy Code. The EPA estimates that over the life of a 30-year mortgage, a Energy Star® Home owner may save more than \$50,000 through reduced monthly utility bills (Utah).

The American Institute of Architects (AIA) recently called for architects to reduce usage of fossil fuels in the construction and operation of new buildings by 50% by 2010. The Governor has ordered state officials to cooperate with AIA in meeting their goals in Utah.

CA Title 24 sets energy efficiency standards for residential and nonresidential buildings (<http://www.energy.ca.gov/title24/index.html>).

NM is considering requiring buildings to cut energy use by 50%.sq ft by 2010.

Volume:

Cost: NM: -\$12/ton. AZ: -\$17/ton.

Implementable:**Impacts:****Other comments:**

RCI-25**Name: Training/enforcement of building codes****Definition:**

The American Institute of Architects (AIA) recently called for architects to reduce usage of fossil fuels in the construction and operation of new buildings by 50% by 2010. The Governor has ordered state officials to cooperate with AIA in meeting their goals in Utah. Building codes could focus on HVAC systems, daylight lighting to reduce lighting needs, and electric lighting design.

NM is considering requiring buildings to cut energy use by 50%.sq ft by 2010. Leadership in Energy and Environmental Design (LEED) standards/certification.

CA Title 24 sets energy efficiency standards for residential and nonresidential buildings. See <http://www.energy.ca.gov/title24/index.html>

Volume:**Cost:****Implementable:****Impacts:****Other comments:**

RCI-26**Name: White Roofs, Rooftop Gardens, and Landscaping (including Shade Tree Programs)**

See RCI-44

Definition:

Some limited provisions for landscaping through utilities and other municipal resources which provide rebates for planting selected shade trees in certain locations around their home.

In one example, the utility will issue a bill credit for the purchase of up to five qualifying shade trees per year. Maximum rebate amount per tree is \$25. However, the rebate will not exceed the purchase price of the tree (sales tax, installation, delivery or associated costs will not be considered part of the total purchase price). See <http://www.riversideca.gov/utilities/resi-treepower.asp>

Volume:**Cost:****Implementable:****Impacts:****Other comments:**

RCI-27**Name: Education of homeowners****Definition:**

Education programs could recognize leadership and leading examples, target specific audiences for campaigns, etc.

Arizona's SRP M-Power is a "prepay electric program that allows you to manage your money the way you want. This popular program lets you buy electricity on your schedule, even daily or weekly, and it gives you financial freedom instead of a bill. An in-home display unit keeps track of how much electricity you're using in dollars and kilowatt-hours. With this helpful information, you've got the freedom to make choices about how much electricity you use and when to buy more. SRP M-Power uses a special electric meter located outside your home. This meter communicates with your small in-home display unit and uses "smart" cards. The "smart" cards work just like pre-paid phone cards, which you can load at any of our more than 50 SRP PayCenters®. And at some locations, you can even buy electricity 24 hours a day." The average SRP M-Power customer saves more than 12% on electricity compared to their usage on other SRP rate plans. See SRP: Get the Power of Freedom with SRP M-Power. <http://www.srpnet.com/payment/mpower/default.aspx#save>

Volume:**Cost:****Implementable:****Impacts:****Other comments:**

RCI-28

Name: Training of Building Managers (apartments, etc.)

See RCI-27

Definition:

Volume:

Cost:

Implementable:

Impacts:

Other comments:

Other

RCI-29

Name: Incentives for Renewable Energy Applications (Solar roofs, water heaters, etc.)

Definition: Incentives to encourage investment and the application of renewable energy could include: 1) direct subsidies for the purchase/sale of renewable energies. 2) tax credits or exemptions given for the purchase of renewable technologies. 3) regulatory policies that provide assurance of cost recovery to the purchaser of renewable technologies. Also, research and development funding for distributed renewables could also fall under this policy option. See <http://www.nmclimatechange.us/ewebeditpro/items/O117F10150.pdf>

Arizona Public Service offers an incentive for its residential customers to upgrade their AC units. The rebate amount is \$250/unit for units with a SEER 14 and EER 12, and \$400/unit for units with SEER 16 / EER 14. To be eligible, AC units must meet both the SEER and EER values. Additionally, the incentive is only offered for replacement equipment, not for new construction. See Arizona Homeowner Incentives for Renewables and Energy, <http://www.dsireusa.org/library/includes/maphomeowner.cfm?State=AZ&CurrentPageId=1&RE=1&EE=1>

CA's Million Solar Roofs Program has set a goal to create 3,000 megawatts of new, solar-produced electricity by 2017 - moving the state toward a cleaner energy future and helping lower the cost of solar systems for consumers. The California Solar Initiative offers cash incentives on solar systems of up to \$2.50 a watt. These incentives, combined with federal tax incentives, can cover up to 50 percent of the total cost of a solar system. Other non-solar renewable incentive programs are available through generation technologies which include microturbines, fuel cells, and wind turbines. Non-solar incentives vary by technology and fuel type. By utilizing incentives from the utility, the average cost for a 50 kW photovoltaic system drops from \$450,000 to \$300,000. See <http://www.cpuc.ca.gov/static/energy/solar/index.htm>; http://www.cpuc.ca.gov/static/energy/electric/051005_sgip.htm

Volume:

Cost: NM: \$105/ton of CO₂

Implementable:

Impacts:

Other comments:

RCI-30**Name: Green Power Programs**

See RCI-6.

Definition:

See Green Pricing, U.S. Dept. of Energy,
<http://www.eere.energy.gov/greenpower/markets/pricing.shtml?page=2&companyid=44>

Volume:**Cost:****Implementable:****Impacts:****Other comments:**

RCI-31

Name: Shared Savings Program for Government Agencies

Definition:

Volume:

Cost:

Implementable:

Impacts:

Other comments:

RCI-32**Name: Marketing Programs****Definition:**

California's Flex Your Power's (FYP) provides an online locator that lists information about energy-efficient and ENERGY STAR qualified new-home developments. Prospective homebuyers and tenants can use the locator to search for developments by county. The website is promoted on all FYP ads and materials. In addition, the FYP electronic newsletter, eNewswire, promotes the new website feature and directs readers to the new home locator. FYP brochures (2 pgs., .pdf) inform prospective homebuyers and renters of the advantages of energy-efficient homes, what to look for before purchasing a home, and how to enhance energy savings after the purchase. Brochures are available for display and distribution. Builders must adhere to the ENERGY STAR Qualified New Homes Program or the utility program verification requirements and ensure that at least one home in each participating development be built to the ENERGY STAR Qualified New Homes Program specification within a 12-month period. Participation in the marketing campaign requires only a 2-page application submission. Last year more than 192,000 new homes were built in California — and more than 19,000 of them were ENERGY STAR qualified, meaning they surpassed the state's Title 24 energy efficiency code by 15%. See http://www.fypower.org/res/efficient_homes/new_homes_initiative/

Volume:**Cost:****Implementable:****Impacts:****Other comments:**

RCI-33**Name: Introduce in School Curriculum****Definition:**

Most federal, state, and even local agencies provide information readily available for educators regarding their area of environmental involvement. Information is available for educators through air quality, land management, water treatment, waste management and other industries involved in environmental management.

Tucson Electric Power has presenters come to classrooms and conduct highly interactive, informative presentations for students. Students will get to ride the energy bike, work with full size and miniature photovoltaic panels and learn about energy efficiency offered through solar energy use and conservation. See <http://www.tucsonsolarschools.com/>

Volume:**Cost:****Implementable:****Impacts:****Other comments:**

Educators may face particular challenges to changes in school curricula which are not part of larger federal mandates (No Child Left Behind Act). Furthermore, major barriers to educational information exist when teachers are not furnished with school curricula materials.

<http://www.aqmd.gov/kidspage/teacher/index.html>

http://www.emwd.org/learning/educator_resources_forms.html

http://www.wm.com/Templates/FAC2964/env_resources.asp

RCI-34**Name: Water pumping and treatment efficiency****Definition:**

At the residential level, water pumping and treatment efficiency is typically confined to improvements homeowners can make. Programs will vary according to suppliers, but some incentive programs may include examples such as trade-out programs for residential customers who currently have a toilet installed in their home that uses 3.5 or more gallons per flush to exchange for high-efficiency toilets that use only 1.28 gallons per flush or less. Other residential water-saving methods might include rebate programs for high-efficiency washers, or “smart controller” watering systems, which are designed to adjust for optimal watering and adjust for seasonal fluctuations. Opportunities for water conservation efforts are also made possible through recycled water programs which may provide qualified applicants with water suitable for irrigating differing crops according to its level of treatment. The cost is free to homeowners and typically the local water district is reimbursed through state funding upon providing proof of exchange with consumers and possible quality assurance information. Other rebate programs are typically furnished by the manufacturer but they may also be coordinated through local water agencies. These high-efficiency toilets use up to 20,000 fewer gallons per year than water-guzzling toilets that can use up to seven gallons per flush. See http://www.emwd.org/conservation/toilet_giveaway.html

Volume:**Cost:****Implementable:****Impacts:****Other comments:**